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DIVISION OF OIL & GAS
SACRAMENTO

DRILLING AND WELL COMPLETION PLAN

Honey Lake Geothermal Project

HL POWER COMPANY

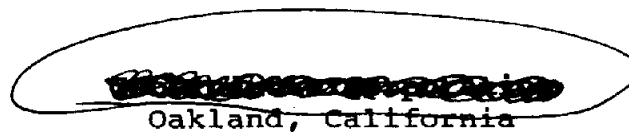
"Wen" 1

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13/29N/15E MD B&M

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Department of Energy
Idaho Operations Office


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1. INTRODUCTION

The User Coupled Confirmation Drilling Program phase of the Honey Lake Hybrid Geothermal-Wood Residue power project involves the drilling of two geothermal wells at the project locations shown in Figures 1 and 2. The first, a production well, will have a nominal target depth of 5000 ft. and will be located at site WEN-W. The second well is tentatively conceived as an injection well (not shown) and will be drilled after a short period of testing to confirm the production capacity of the first well. The depth of the second well will be between 2500 and 5000 ft. and sited pending the outcome of testing on the first well. Secondary drill sites WEN-E and AM will be considered for production drilling if the effort at WEN-W is less than a complete success.

The activities discussed below pertain to production drilling at site WEN-W.

2. PERMITS

Permits from three state and local agencies are necessary in order to initiate field activities under the subject cooperative agreement. A drilling permit application was submitted on March 9, 1981 to the California Division of Oil and Gas (CDOG). Interested agencies participated in a site visit on April 9, and permit approval is expected by June 15.

A land use permit application was submitted to the Lassen County Planning Commission on March 11, 1981, and a preliminary reservoir test and fluid discharge plan was submitted to the Lahontan Regional Water Quality Control Board on April 13, 1981.

Permits from both agencies are expected by or shortly after June 18, 1981 but well in advance of the projected July 20 spud date.

3. CONSTRUCTION AND SITE PREPARATION

An access road (~ .2 mile) will be provided from Lassen County Road 320 to drill site WEN-W. Brush will be cleared from the site and road; both will be leveled, graveled, and compacted as needed.

Water for the drilling operation will be provided from an existing irrigation well about one mile from the site or the participants may elect to drill a supply well on one corner of the drilling pad. In either case, provision will be made for a continuous supply of up to 300 gpm.

The general shape of the drilling pad will be rectangular, with approximate dimensions of 100 feet by 250 feet. The pad will be adequate for a rig capable of drilling a well to 6,000 feet.

A circular or oval-shaped settling pond for mud and cuttings will be located adjacent to the pad. The pond will have a nominal 200,000 gal. capacity. Water overflow from the pond will be directed to an existing sump which will also be used to contain fluids during the test phase. This sump has a capacity of 5-6 million gallons.

Typical configurations for the drilling pad and settling pond and for the deployment of drilling equipment are shown in Figure 3.

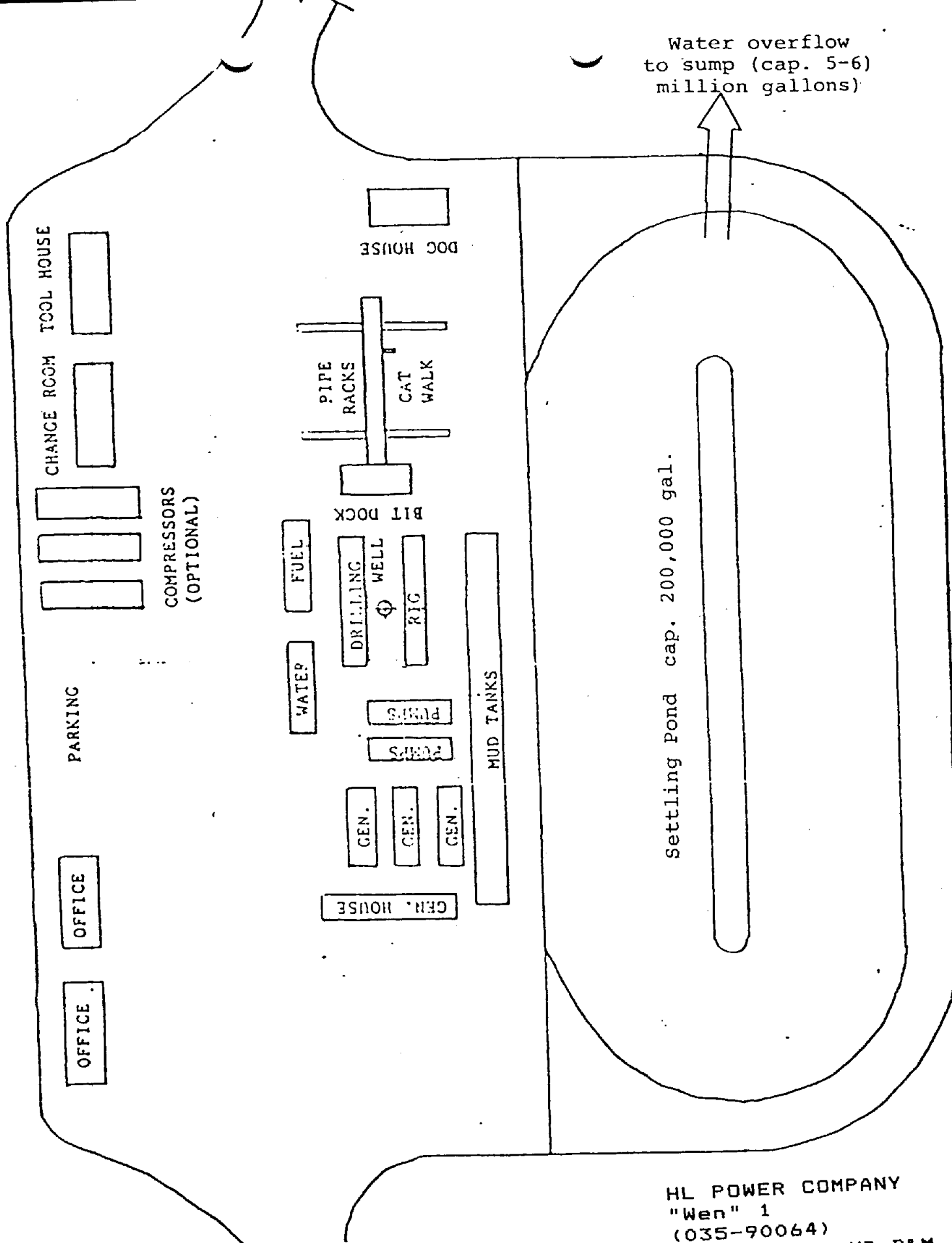


Figure 3. General Site Layout

No toxic drilling fluids will be used, thus allowing the use of an unlined sump. Upon fluid dehydration, the settling pond and sump will be covered and the site restored to its original condition.

Portable field generators will be used to provide site power. Portable sanitation facilities will also be provided.

4. DRILLING PROGRAM

The drilling prognosis is described below. The well construction profile is shown in Figure 4 and a time-phased drilling profile is provided in Figure 5.

- a. Drill 30 in. \pm hole to 100 ft. \pm .
- b. Run 20 in. conductor pipe and cement to surface using Ready Mix Cement.
- c. Construct cellar 4 ft. deep at least 6' x 6', equipped with a drain to the sump.
- d. Rig up drilling rig over conductor pipe.
- e. Install single annular-type blow-out preventor on conductor and test to 100 psi (see Figure 6). ~~Notify representative of CDOG to witness test.~~
- f. Spud well with 17½ in. bit and drill to 1000 \pm ft. with mud. Run TOTCO drift indication surveys every 150 ft., with maximum angle to be 5°. Maximum rate of change should be no greater than 1½° per 100 ft. Directional multi-shot survey to be run at casing point on conditioning trip. (See Table 1 for mud and directional programs.)

- g. Run formation and temperature logs (See Table 1).
- h. Run 13-3/8 in. casing to total depth and cement from total depth to surface using stab-in-type cementing shoe (See Table 2 for casing and cementing program).
- i. Cut off 13-3/8 in. casing and weld-on casinghead. Install blow-out preventers as specified in Figure 7. Test blow-out preventers at 500 psi. Notify representative of CDOG to witness test.
- j. Drill 12-1/4 in. hole with mud to 3000 \pm feet. Run TOTCO drift indication surveys every 150 feet, maximum angle to be 8°. Maximum rate of change should be no greater than 1 1/2° per 100 ft.
- k. Run formation and temperature logs. Run multi-shot directional survey on hole-conditioning trip.
- l. Run 9-5/8 in. casing as a liner hung from 200' inside of the 13-3/8 in. casing to total depth. Hang liner and cement from top to bottom.
- m. Drill out all cement from top of liner lap and test casing, lap, and blow out preventers to 600 psi before drilling out 9-5/8 in. casing shoe.
- n. Drill out 9-5/8 in. casing with 8-3/4 in. bit with water and drill 8-3/4 in. hole to total depth, to be specified by operator (nominally 5,000 feet). The water may require light gelling as the hole dictates. Run TOTCO drift indication surveys every 150 feet, maximum angle

to be no greater than 10° . Maximum rate of change should be no greater than $1\frac{1}{2}^{\circ}$ per 100 feet.

- o. Circulate hole clean at total depth and displace hole with fresh water.
- p. Prepare to test and evaluate as required.

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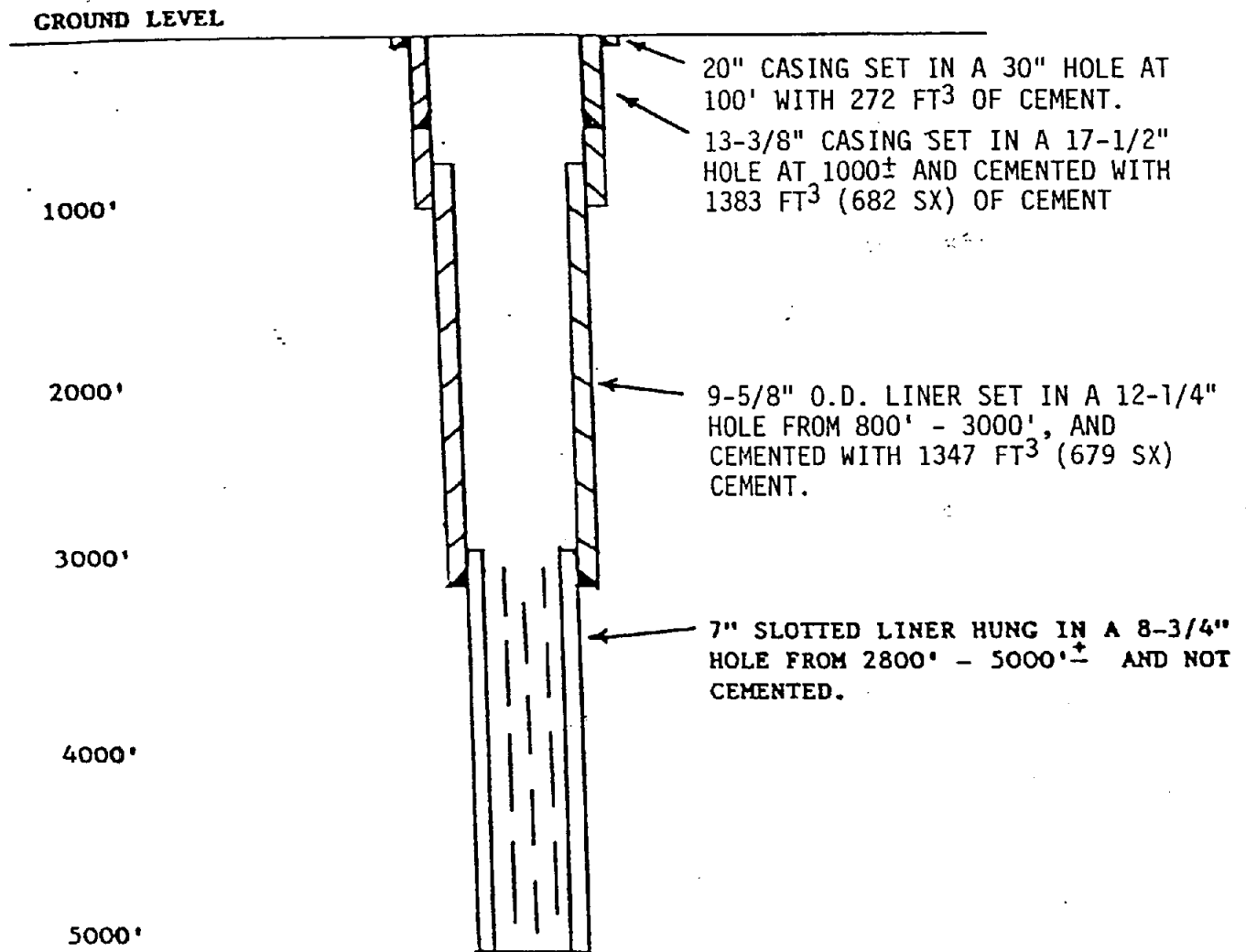


Figure 4. Well Construction Profile

5. Time Phased Drilling

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